

WHAT IS CLAIMED IS:

1. A method of transporting a workpiece in a semiconductor processing apparatus comprising a transfer chamber, a process chamber, and a gate valve between the transfer chamber and the process chamber, the method comprising:

flowing an inert gas into the process chamber while the gate valve is closed;
turning off the inert gas flowing into the process chamber while the gate valve is closed;

flowing an inert gas into the transfer chamber;
opening the gate valve while flowing inert gas into the transfer chamber and while the flowing of inert gas into the process chamber remains off; and
transferring the workpiece between the transfer chamber and the process chamber through the opened gate valve.

2. The method of Claim 1, wherein flowing inert gas into the transfer chamber is initiated at least 2 seconds before opening the gate valve.

3. The method of Claim 2, wherein flowing inert gas into the transfer chamber is initiated at least 10 seconds before opening the gate valve.

4. The method of Claim 1, further comprising creating a pressure differential between the transfer chamber and the process chamber while the gate valve is closed;

5. The method of Claim 4, wherein the pressure differential created is a lower pressure in the process chamber than in the transfer chamber.

6. The method of Claim 5, wherein the pressure differential is between 5 mTorr and 100 mTorr.

7. The method of Claim 5, wherein the pressure differential is between 100 mTorr and 300 mTorr.

8. The method of Claim 5, wherein the pressure differential is created by vacuum pumping the transfer chamber and vacuum pumping the process chamber.

9. The method of Claim 8, wherein vacuum pumping the transfer chamber is discontinued prior to opening the gate valve.

10. A method of transporting a workpiece in a semiconductor processing apparatus, comprising:

operating a first pump in fluid communication with a first chamber of the processing apparatus to achieve a first pressure in the first chamber;

operating a second pump in fluid communication with a second chamber of the processing apparatus to achieve a second pressure in the second chamber;

flowing an inert gas into the first chamber;

opening a gate valve positioned between the first chamber and the second chamber while flowing inert gas into the first chamber;

isolating the first pump from the first chamber prior to opening the gate valve;

and

transferring the workpiece through the gate valve between the first chamber and the second chamber.

11. The method of Claim 10, wherein the first pressure is greater than the second pressure.

12. The method of Claim 11, wherein the second pressure is below the operating pressure in the second chamber during processing of the workpiece.

13. The method of Claim 11, further comprising flowing inert gas into the second chamber prior to opening the gate valve, wherein the flowing of inert gas into the second chamber is discontinued immediately prior to opening the gate valve.

14. The method of Claim 13, further comprising generating an inert gas curtain at a side of the gate valve adjacent the first chamber.

15. The method of Claim 14, wherein the inert gas curtain is generated by inert gas jets in the first chamber directed towards the second chamber along a perimeter wall of the gate valve.

16. A method of transferring a semiconductor workpiece in a cluster tool for processing workpieces comprising a first chamber, a second chamber, and a gate valve positioned between the first chamber and the second chamber, the method comprising:

operating a first pump to create a first pressure in the first chamber;

operating a second pump to create a second pressure in the second chamber, wherein the second pressure is lower than the first pressure;

isolating the first pump from the first chamber;

flowing purge gas into the first chamber before isolating the first pump;
opening the gate valve while the purge gas is flowing; and
transferring the workpiece through the open gate valve between the first
chamber and the second chamber

17. The method of Claim 16, further comprising flowing inert gas into the second chamber and discontinuing flowing the inert gas into the second chamber prior to opening the gate valve.

18. The method of Claim 16, wherein the first pump is isolated from the first chamber at least 1 second before opening the gate valve.

19. The method of Claim 16, wherein flowing purge gas into the first chamber is initiated at least 2 seconds prior to opening the gate valve.

20. The method of Claim 16, wherein the second pump continues to operate while the gate valve is open.